



**SmartGen**  
ideas for power

**HPD300**

**REVERSE POWER PROTECTION RELAY**  
**MULTIFUNCTIONAL PROTECTION MODULE**  
**USER MANUAL**



**SMARTGEN (ZHENGZHOU) TECHNOLOGY CO.,LTD.**



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Chinese trademark

**SmartGen** English trademark

**Smartgen** — make your generator *smart*

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Version history

| Date | Version    | Content                                             |
|------|------------|-----------------------------------------------------|
| 1.0  | 2014-08-07 | Original release.                                   |
| 1.1  | 2014-10-09 | Rename the product.                                 |
| 1.2  | 2015-03-24 | Add "Multifunctional Protection Module" to the name |
|      |            |                                                     |



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## 1 OVERVIEW

HPD300 reverse power protection relay is widely used in marine genset field and land genset field.

The power direction, instead of flowing predominantly generator to Bus as usual, flows backward to generator from current system when generator lost excitation or other failure occurs. That is to say, generator works as electromotor. HPD300 reverse power protection relay is in order to avoid the above situation and provide protection when over power situation occurs.

## 2 PERFORMANCE AND CHARACTERISTICS

- Suitable for 3-phase 4-wire, 3-phase 3-wire, single phase 2-wire, and 2-phase 3-wire systems with frequency 50/60/400Hz;
- Collects 3-phase voltage, 3-phase current, frequency and power parameters.

### GEN

Line voltage (Uab, Ubc, and Uca)

Frequency (Hz)

### LOAD

Current IA, IB, IC

Active Power kW

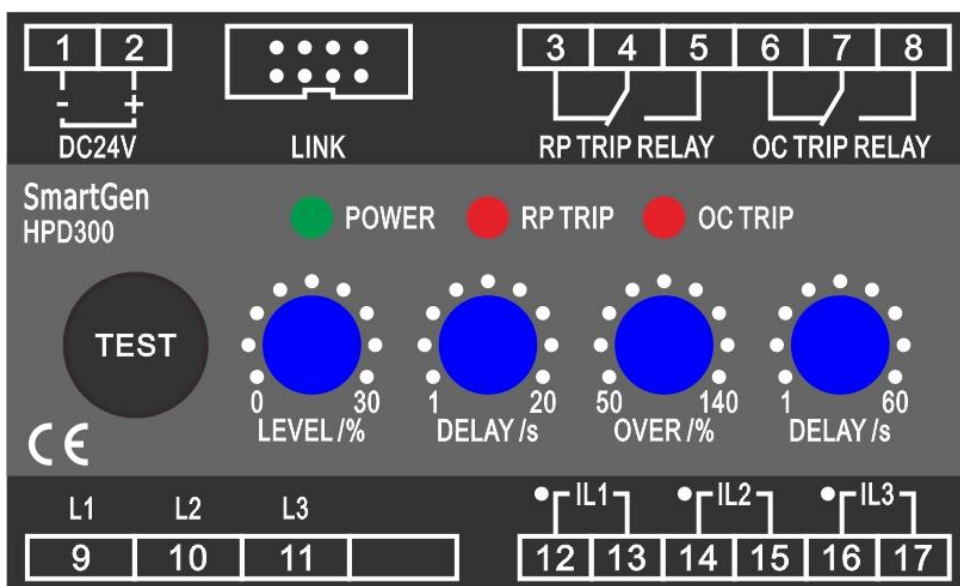
- Adjustable potentiometer allows for set value adjusting and delay value setting.
- 2 relay output;
- One test button, test reverse power, over current and indicator.
- Widely power supply range DC(8~35)V, suitable to different starting battery voltage environment;
- 35mm guide rail mounting;
- Modular design, pluggable terminal, compact structure with easy installation.

## 3 TECHNICAL PARAMETERS

| Parameter                  | Details                                                                                                                                |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Working Voltage            | DC8. 0V to 35. 0V, continuous power supply                                                                                             |
| Overall Consumption        | <0.9W (Standby mode: ≤0.28W)                                                                                                           |
| AC Input:                  | AC30V~ AC620V (ph-ph)                                                                                                                  |
| Alternator Frequency       | 50Hz/60Hz/400Hz                                                                                                                        |
| Reverse Power Relay Output | 5A AC250V Volts free output                                                                                                            |
| Over Current Relay Output  | 5A AC250V Volts free output                                                                                                            |
| Case Dimensions            | 89.7mm x 71.6mm x 60.7mm                                                                                                               |
| CT Secondary Current       | Rated 5A                                                                                                                               |
| Working Conditions         | Temperature: (-25~+70)°C Humidity: (20~93)%RH                                                                                          |
| Storage Conditions         | Temperature:(-25~+70)°C                                                                                                                |
| Insulation Intensity       | Apply AC2.2kV voltage between high voltage terminal and low voltage terminal;<br>The leakage current is not more than 3mA within 1min. |
| Weight                     | 0.24kg                                                                                                                                 |



#### 4 PANEL BUTTON DESCRIPTION



Description of terminal connection:

| No.       | Functions                    |                  | Cable Size          | Remark                                                                                                                                        |                                                  |  |
|-----------|------------------------------|------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|--|
| 1         | B-                           |                  | 1.0mm <sup>2</sup>  | Connected with negative of starter battery.                                                                                                   |                                                  |  |
| 2         | B+                           |                  | 1.0mm <sup>2</sup>  | Connected with positive of starter battery.                                                                                                   |                                                  |  |
| 3         | RP TRIP RELAY                | Normally Close   | 2.5 mm <sup>2</sup> | Active when the reverse power has exceeded the set value and the delay timer has expired while deactivate after the power returns to normal.  | Normally open;<br>Volts free output;<br>5A Rated |  |
| 4         |                              | COM              |                     |                                                                                                                                               |                                                  |  |
| 5         |                              | Normally Open    |                     |                                                                                                                                               |                                                  |  |
| 6         | OC TRIP RELAY                | Normally Close   | 2.5 mm <sup>2</sup> | Active when the load current has exceeded the set value and the delay timer has expired while deactivate after the current returns to normal. |                                                  |  |
| 7         |                              | COM              |                     |                                                                                                                                               |                                                  |  |
| 8         |                              | Normally Open    |                     |                                                                                                                                               |                                                  |  |
| 9         | L1                           |                  | 1.0 mm <sup>2</sup> | Phase Voltage Input                                                                                                                           |                                                  |  |
| 10        | L2                           |                  | 1.0 mm <sup>2</sup> |                                                                                                                                               |                                                  |  |
| 11        | L3                           |                  | 1.0 mm <sup>2</sup> |                                                                                                                                               |                                                  |  |
| 12        | IL1                          | Dotted Terminals | 1.5 mm <sup>2</sup> | CT A-phase input; Externally connected to secondary coil of current transformer (rated 5A).                                                   |                                                  |  |
| 13        |                              |                  |                     |                                                                                                                                               |                                                  |  |
| 14        | IL2                          | Dotted Terminals | 1.5 mm <sup>2</sup> | CT B-phase input; Externally connected to secondary coil of current transformer (rated 5A).                                                   |                                                  |  |
| 15        |                              |                  |                     |                                                                                                                                               |                                                  |  |
| 16        | IL3                          | Dotted Terminals | 1.5 mm <sup>2</sup> | CT C-phase input; Externally connected to secondary coil of current transformer (rated 5A).                                                   |                                                  |  |
| 17        |                              |                  |                     |                                                                                                                                               |                                                  |  |
| LINK Port | Used for parameters setting. |                  |                     |                                                                                                                                               |                                                  |  |



## 5 FUNCTION DESCRIPTION

| Item                                                 | Description                                                                                                                                                                                                          |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Indicator                                      | Power supply indicator; It is illuminated when the relay is powered up. (green light)                                                                                                                                |
| RP TRIP Indicator                                    | It flashes once per second when the reverse power has exceeded the set value and RP TRIP indicator light on when the delay timer has expired. The indicator extinguished after power returns to normal. (red light)  |
| OC TRIP Indicator                                    | It flashes once per second when the load current has exceeded the set value and OC TRIP indicator light on when the delay timer has expired. The indicator extinguished after current returns to normal. (red light) |
| TEST Button                                          | Press the button for 3 seconds, the reverse relay and indicator output; Press the button and release the button, within 1 second, again press it for 3 seconds, over current trip relay and indicator output.        |
| LEVEL /%<br>Reverse Power Set<br>Value Potentiometer | Used for adjusting reverse power set value. Range: (0~30)%; Setting value is the percentage of rated power value.                                                                                                    |
| DELAY /s<br>Delay Value<br>Potentiometer             | Used for adjusting delay value. Range: (1~20)%; It is the delay timer of reverse power action.                                                                                                                       |
| OVER/%<br>Over Current Set Value<br>Potentiometer    | Used for adjusting over current set value. Range: (50~140)%; Setting value is the percentage of rated power value.                                                                                                   |
| DELAY /s<br>Delay Value<br>Potentiometer             | Used for adjusting delay value. Range: (1~60)s; It is the delay timer of over current action.                                                                                                                        |



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## 6 SCOPES AND DEFINITIONS OF PROGRAMMABLE PARAMETERS

| No. | Items                   | Parameters     | Defaults | Description                          |
|-----|-------------------------|----------------|----------|--------------------------------------|
| 1   | AC System               | (0-3)          | 0        | 0: 3P4W, 1: 3P3W<br>2: 2P3W, 3: 1P2W |
| 2   | Gen Rated Voltage       | (30-30000)V    | 380      |                                      |
| 3   | Gen Rated Frequency     | (10.0-400.0)Hz | 50.0     |                                      |
| 4   | Volt. Trans.(PT)        | (0-1)          | 0        | 0: Disable 1: Enable                 |
| 5   | Primary Voltage         | (30-30000)V    | 100      |                                      |
| 6   | Secondary Voltage       | (30-1000)V     | 100      |                                      |
| 7   | CT Ratio                | (5-6000)/5     | 500      |                                      |
| 8   | Full Load Rated Current | (5-6000)A      | 500      |                                      |
| 9   | Rated Power             | (0-6000) kW    | 500      |                                      |
| 10  | Communication Address   | (1-254)        | 1        |                                      |

### PC Program:

Parameters setting and real-time monitoring can be implemented via LINK port by using PC software and an SG72 adapter which produced by our company. As follows:



**HPD300 設定PW**  
**直接點確定或0318**



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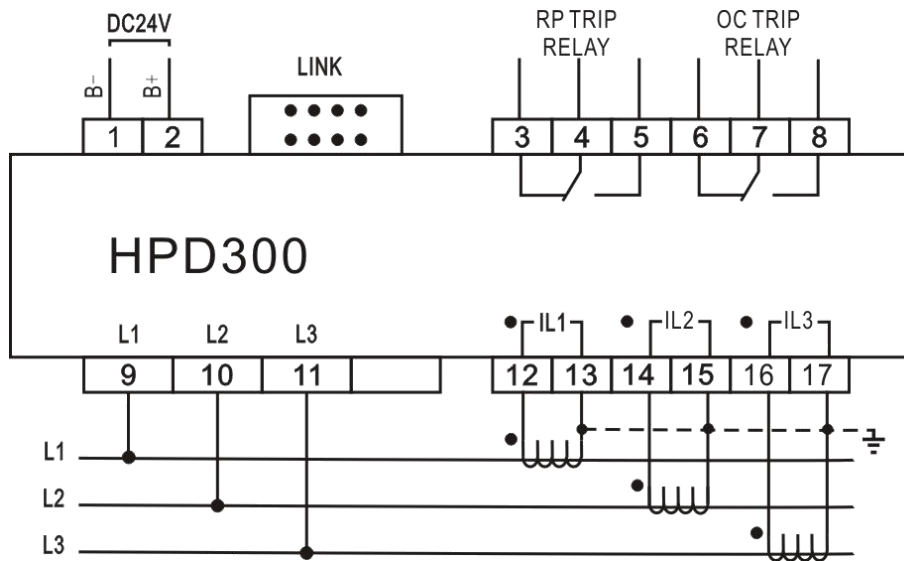
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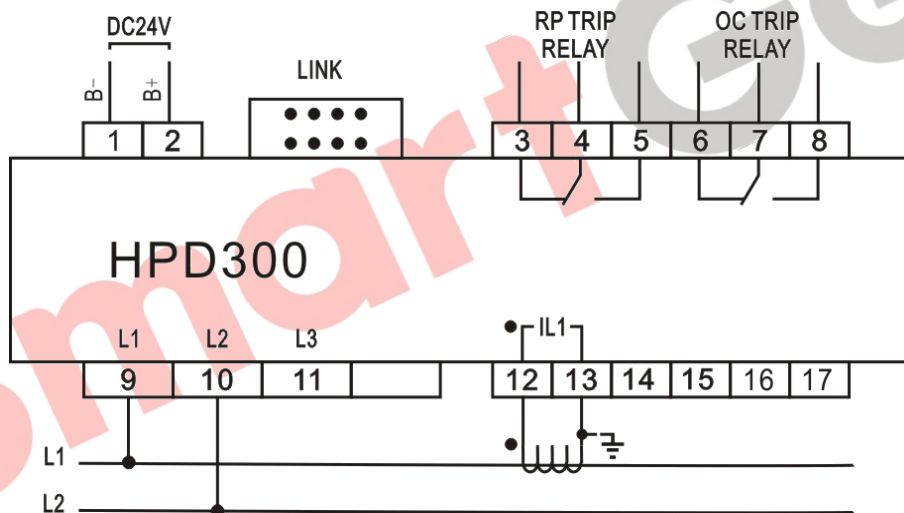


## 7 TYPICAL DIAGRAM

3 phase 3 wire/3 phase 4 wire



Single phase 2 wire/2 phase 3 wire



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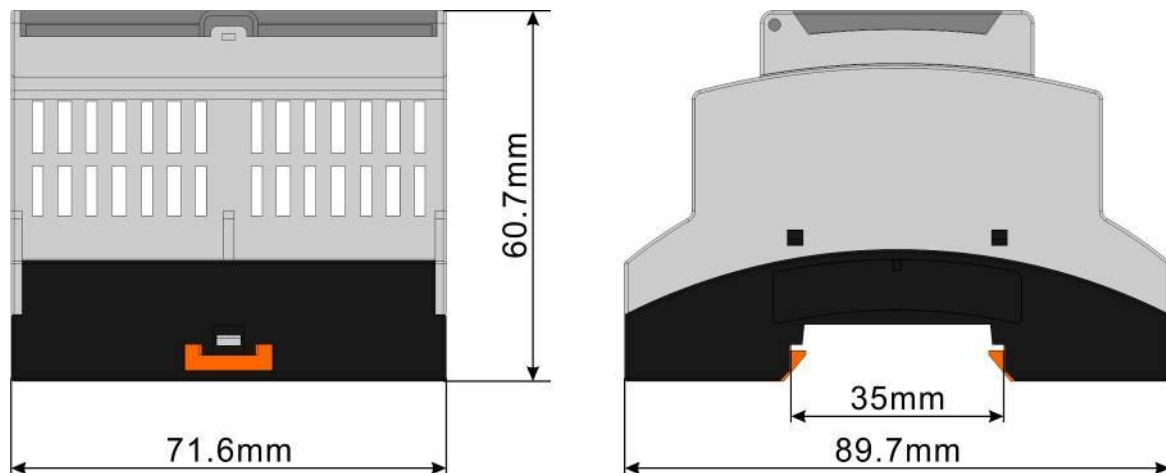
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## 8 INSTALLATION DIMENSIONS



### 1) Output And Expand Relays

All outputs are relay contact output type. If need to expand the relays, please add freewheel diode to both ends of expand relay's coils (when coils of relay has DC current) or, add resistance-capacitance return circuit (when coils of relay has AC current), in order to prevent disturbance to controller or others equipment

### 2) AC Input

Current input must be connected to outside current transformer. And the current transformer's secondary side current must be 5A. At the same time, the phases of current transformer and input voltage must correct. Otherwise, the current of collecting and active power maybe not correct.

▲ Note: When there is load current, transformer's secondary side prohibit open circuit.

### 3) Withstand Voltage Test

▲ **CAUTION!** When relay had been installed in control panel, if need the high voltage test, please disconnect relay's all terminal connections, in order to prevent high voltage into relay and damage it.



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